previous hurricanes and, in fact, with those observed in the present hurricane as soon as it left Cuba. The northward path from Cuba into Florida and along the south Atlantic coast presents another illustration of the ease with which the hurricane develops on the ocean or the immediate coast and the difficulty with which it penetrates the interior of the continent. The present whirl appears to have grown in size very slowly and also to have moved quite slowly during its whole path not only in the West Indies, but also after reaching the south Atlantic States. On the 30th, noon, it was southeast of New Jersey, and the rest of its career belongs to October.

H. This was a continuation of low No. XIII that was central in the upper Lake region on the 22d and passed over Labrador on the 24th; it disappeared on the 25th south of Greenland.

I and *K.* A depression (*I*) appeared on the 23d central about N. 38°, W. 22°; it moved northward, reaching N. 47°, W. 23°, on the 25th, while a similar small depression (*K*) stretched southward from this region and another, above described as *E*, moved to the eastward over the British Channel. The whirl, *K*, soon broke up, and *I* disappeared on the 27th without much further movement.

L. This appeared on the 27th central at N. 50°, W. 40°; it is not likely to have been a continuation of area *H*, although it was very nearly in the same place, but is rather an evidence of the extremely unstable condition of the atmosphere at this time and of the ease with which the great flow of upper currents from the tropics initiate short-lived whirls and barometric depressions on the edges of regions of high pressure. By the 28th area *L* had divided into two portions, respectively central at N. 48°, W. 52°, and N. 38°, W. 58°, but the whole of this portion of the atmosphere was in that state of motion known as turbulent flow in the hydraulics of rivers, and the alternations were very rapid from horizontal to ascending or descending motion and from high to low pressures and from rectilinear to whirling motions. By the 28th three or four whirls had formed between the hurricane on our south Atlantic coast and the high area over the North Sea. On the 30th the center was at about N. 50°, W. 27°, and hurricane winds were reported by the *Lackawanna* and *Fonar*.

M. This area was central on the 29th over Newfoundland at N. 49°, W. 55°. By the 30th it had moved southeast as a severe hurricane to N. 48°, W. 44°. Reports of low pressures and high winds in connection with this storm were received from the *Iona* and *Hecla* on the 30th. The map of the latter date presents six low areas between the Ural and the Rocky mountains and between N. 35° and N. 55°, and it must be reserved for the first few days of October to show how the upper current, overflowing from tropical latitudes, was drawn off in different directions, or tapped, as it were, to supply first one and then another of these whirls until finally some subsided while others continued developing as severe storms.

OBSERVATIONS IN THE CARIBBEAN SEA.

The following summaries of observations made at British Colonial Hospitals may throw some light on the weather in the adjoining portions of the Caribbean Sea:

Balize, July, 1894. The barometric range reduced to sea level, maximum, 30.154, on the 4th; minimum, 29.965, on the 16th. The temperature of the air, maximum, 89.9, on the 12th; minimum, 73.0, on the 4th. The relative humidity of the atmosphere varied between 99 and 83 per cent. The prevailing wind for the month was southeast. Rain fell on 13 days, the maximum being 3.18 on the 4th; total rainfall, 7.67, which is about 91 per cent of the normal for July.

Punta Gorda, July, 1894. The temperature of the air, maximum, 94, on 22d; minimum, 69.0, on the 9th. The prevailing wind was northeast. Rainfall on 15 days, the maximum being 5.50 on the 28th; total rainfall, 19.52.

Balize, August, 1894. The barometric range reduced to sea level, maximum, 30.127, on the 10th; minimum, 29.925, on the 26th. The temperature of the air, maximum, 90.9, on the 23d; minimum, 74.1, on the 21st. The relative humidity of the atmosphere varied between 95 and 88 per cent. The prevailing wind was southeast. Rainfall on 11 days, the maximum being 1.31 on the 21st; total rainfall, 3.24, which is about 40 per cent of the normal for August.

Punta Gorda, August, 1894. The temperature of the air, maximum, 87.5, on the 30th; minimum, 70.0, on the 31st. Rainfall on every day of the month, the maximum being 4.28 on the 8th; total rainfall, 26.89. The prevailing wind was northeast.

Balize, September, 1894. The barometric range reduced to sea level, maximum, 30.073, on the 13th; minimum, 29.811, on the 28th. The temperature of the air, maximum, 94, on the 26th; minimum, 70.0, on the 5th. The relative humidity of the atmosphere varied between 98 and 79 per cent. The prevailing wind was southeast. Rainfall on 10 days, the maximum being 2.67 on the 26th; total rainfall, 5.16, which is about 50 per cent of the normal for September.

Punta Gorda, September, 1894. The temperature of the air, maximum, 91, on the 20th; minimum, 71.0, on the 10th, 16th, and 29th. Rainfall on 18 days, the maximum being 3.21 on the 11th. The prevailing wind was northeast.

OCEAN ICE.

The positions of icebergs and field ice reported for September, 1894, are shown on Chart I by crosses.

The following table shows the southern and eastern limits of the regions within which icebergs or field ice were reported for this month during the last twelve years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
	° ′	° ′		° ′	° ′
September, 1883	43 25	47 10	September, 1883	49 01	44 33
September, 1884	46 00	53 21	September, 1884	47 39	49 14
September, 1885	45 40	48 22	September, 1885	48 40	46 27
September, 1886	46 40	53 00	September, 1886	48 00	48 40
September, 1887	45 37	40 50	September, 1887	45 37	40 50
September, 1888	Off Cape	Race.	September, 1888	53 00	52 08
September, 1889	46 21	48 22	September, 1889	48 59	46 48
September, 1890 *	45 30	48 00	September, 1890	50 30	46 22
September, 1891	Straits of Belle Isle		September, 1891	53 18	51 20
September, 1892	Straits of Belle Isle		September, 1892	52 04	54 55
September, 1893	44 27	48 29	September, 1893	46 50	45 20
September, 1894	44 00	46 45	September, 1894	48 34	46 18
Mean	45 52	48 15	Mean	49 21	47 44

* On the 4th a large lump of ice 100 feet long and 6 feet above water was reported in N. 36° 49′, W. 42° 18′; this is the lowest latitude in which ice was ever reported in the North Atlantic Ocean.

A reference to the table will show that in the last twelve years there have been but two Septembers (1891 and 1892) for which ice has not been reported south of the fiftieth parallel, and that the eastern limit of ice for the current month is about 1½° east of the average eastern limit for September.

OCEAN FOG.

The limits of fog belts west of the fortieth meridian, as reported by shipmasters, are shown on Chart I by dotted shading. Near the Banks of Newfoundland fog was reported on 15 dates; between the fifty-fifth and sixty-fifth meridians on 11 dates; and west of the sixty-fifth meridian on 11 dates. Compared with the corresponding month of the last six years, the dates of occurrence of fog near the Grand Banks numbered 1 less than the average; between the fifty-fifth and sixty-fifth meridians, 5 more than the average; and west of the sixty-fifth meridian, 3 more than the average.

TEMPERATURE OF THE AIR.

[*In degrees Fahrenheit.*]

The distribution of the monthly mean temperature of the air over the United States and Canada is shown by the dotted isotherms on Chart II; the lines are drawn over the high irregular surface of the Rocky Mountain plateau, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the

country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

NORMAL TEMPERATURE.

In Table II, for voluntary observers, the mean temperature is given for each station, but in Table I, for the regular stations of the Weather Bureau, both the mean temperatures and the departures from the normal are given for the current month. In the latter table the stations are grouped by geographical districts, for each of which is given the average temperature and departure from the normal; the normal for any district or station may be found by adding the departures to the current average when the latter is below the normal and by subtracting when it is above.

MONTHLY MEAN TEMPERATURE.

For the regular stations of the Weather Bureau the monthly mean temperature is the simple mean of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II.

During September, 1894, the highest mean temperatures at regular Weather Bureau stations were: Yuma, 83.3; Key West, 81.4; Corpus Christi, 81.0; Port Eads, 80.4; Jupiter, 80.2; New Orleans, 79.9; Tampa and San Antonio, 79.4; Titusville, 78.8; Jacksonville, 78.6; Charleston, 77.6; Savannah, 77.2.

DEPARTURES FROM NORMAL TEMPERATURE FOR SEPTEMBER, 1894.

As compared with the normal for September the mean temperatures for the current month were decidedly in excess in a belt extending from Minnesota southeast to Pennsylvania. The largest excesses were: Marquette, 6.3; Port Huron, 5.1; Rochester, 4.8; Parkersburg and Duluth, 4.4; Huron, 4.3. The principal region of deficit covered the Rocky Mountain plateau and the Pacific slope. The greatest deficits were: Walla Walla, 3.1; Salt Lake City, 2.9; Winnemucca and Helena, 2.6; Laramie, 3.6.

Considered by districts, the mean temperatures for the current month show the following departures from normal temperatures:

Positive departures: New England, 2.4; middle Atlantic, 3.2; south Atlantic, 1.9; east Gulf, 1.3; west Gulf, 0.9; Ohio Valley and Tennessee, 3.5; lower Lakes, 4.0; upper Lakes, 3.8; North Dakota (extreme northwest), 1.6; upper Mississippi Valley, 2.9; Missouri Valley, 2.4; middle slope, 0.9; southern slope (Abilene), 1.7; middle Pacific, 1.7.

Negative departures: Key West, 0.6; northern slope, 0.9; southern plateau, 0.4; middle plateau, 2.2; northern plateau, 2.0; north Pacific, 0.3; southern Pacific, 1.3.

For certain voluntary stations of rather long periods of observation the normal and extreme mean temperatures and the departures are shown in detail in Table X *a*, which is now placed among the meteorological tables instead of being inserted in the text as heretofore.

YEARS OF HIGHEST MEAN TEMPERATURE FOR SEPTEMBER.

The mean temperature for September, 1894, was the highest on record at regular Weather Bureau stations, as shown in the following table, which also gives the highest previous record:

Stations.	September, 1894.		Highest previous.	
	Mean temperature.	Departure from normal.	Temperature.	Year.
Raleigh, N. C	73.0	+2.8	72.0	1891
Parkersburg, W. Va	70.2	+4.4	69.0	1891

YEARS OF LOWEST MEAN TEMPERATURE FOR SEPTEMBER.

The mean temperature for September, 1894, was the lowest on record at regular Weather Bureau stations, as shown in the following table:

Stations.	September, 1894.		Lowest previous.	
	Mean temperature.	Departure from normal.	Temperature.	Year.
Lander, Wyo	52.9	−3.9	53.6	1889

MAXIMUM TEMPERATURE.

The maximum temperatures of the month at regular stations of the Weather Bureau are given in Table I, from which it appears that the highest maxima were: Yuma, 109; Oklahoma, 104; Fresno, 102; Red Bluff, St. Vincent, and Tucson, 100.

The lowest maxima were: Tatoosh Island, 65; Neah Bay, 69; Eureka, 71; Port Crescent, 72; Pysht, 73; Block Island, 76; Point Reyes Light, 76.

YEARS OF HIGHEST MAXIMUM TEMPERATURE FOR SEPTEMBER.

The maximum temperatures for September were the highest on record at regular Weather Bureau stations, as shown in the following table:

Stations.	September, 1894.		Highest previous.	
	Maximum.	Excess above previous record.	Temperature.	Year.
Olympia, Wash	88	+3	85	1889
St. Vincent, Minn	100	+6	94	1889
Moorhead, Minn	98	+4	94	1889
Duluth, Minn	94	+4	90	*
Northfield, Vt	85	0	85	1891
Narragansett Pier, R. I	79	+2	77	*
Vineyard Haven, Mass	84	+2	82	*
St. Paul, Minn	94	0	94	1893
La Crosse, Wis	94	+1	93	1891
Dubuque, Iowa	95	+1	94	*
Green Bay, Wis	93	+1	92	1891
Milwaukee, Wis	94	0	94	*
Grand Haven, Mich	88	0	88	1889
Port Huron, Mich	92	0	92	1881
Indianapolis, Ind	95	+1	94	*
Lexington, Ky	92	+1	91	*
Parkersburg, W. Va	96	+4	92	1891
Cape Hatteras, N. C	96	+2	94	*
Raleigh, N. C	93	+1	92	*
Columbia, S. C	96	0	96	1887
Charleston, S. C	95	+1	94	*

* Frequently.

MINIMUM TEMPERATURE.

The minimum temperatures of the month at regular stations of the Weather Bureau are given in Table I, from which it appears that the lowest minima were:

Idaho Falls and St. Vincent, 23; Williston, 24; Northfield, 25; Bismarck, Havre, and Winnemucca, 26; Valentine and Lander, 27; Moorhead, 28.

Among the highest minima were: Key West, 71; Jupiter and Port Eads, 70; Galveston, 68; Corpus Christi, 67; New Orleans, 66.

YEARS OF LOWEST MINIMUM TEMPERATURE FOR SEPTEMBER.

The minimum temperatures for September were the lowest on record at regular Weather Bureau stations, as shown in the following table:

Stations.	September, 1894.		Lowest previous.	
	Minimum.	Deficit below previous record.	Temperature.	Year.
Carson City, Nev	28	0	28	1889
Yuma, Tex	50	0	50	1882
Northfield, Vt	25	0	25	1888
Erie, Pa	36	−1	37	1888

THE DAILY AND MONTHLY RANGES OF TEMPERATURE.

The greatest daily range of temperature is given for each

of the regular Weather Bureau stations in Table I, which also gives data from which may be computed the extreme monthly ranges for each station.

Greatest daily ranges.—Large values: Bismarck and Rapid City, 54; Pueblo, 50; Lander, 48; Dubuque and North Platte, 47; Huron, 46; Williston, 45. Small values: Hatteras, 12; Tatoosh Island and Kittyhawk, 16; Jupiter and Key West, 17; Port Eads, Galveston, and Titusville, 18; New Orleans, 19; Corpus Christi, 20.

Extreme monthly ranges.—Large values: St. Vincent, 77; Moorhead, 70; Bismarck, Pierre, and Valentine, 68; Huron, 64; Dubuque, 62; La Crosse, 61; Alpena, 60. Small values: Key West and Hatteras, 18; Jupiter, Galveston, and Tatoosh Island, 20; Port Eads, 22; Corpus Christi, 23; New Orleans, 24; Southport, 25; Block Island and Titusville, 26.

ACCUMULATED TEMPERATURES.

From January 1 to the end of the current month the average temperature for each geographical district was above or below the normal by an amount that is given in the last column of the following table. The accumulated monthly departures from normal temperatures, as given in the second column, may be used for comparison with the departures of current conditions of vegetation from the normal conditions.

Districts.	Accumulated departures.		Districts.	Accumulated departures.	
	Total.	Average.		Total.	Average.
	°	°		°	°
New England	+10.5	+1.2	Key West	−4.6	−0.5
Middle Atlantic	+15.2	+1.7	West Gulf	−0.2	0.0
South Atlantic	+7.0	+0.8	Southern plateau	−16.7	−1.9
East Gulf	+0.4	0.0	Middle plateau	−10.5	−1.2
Ohio Valley and Tennessee	+14.3	+1.6	Northern plateau	−4.0	−0.4
Lower Lake	+22.7	+2.5	Northern Pacific	−7.6	−0.8
Upper Lake	+27.4	+3.0	Middle Pacific	−11.5	−1.3
North Dakota (Ex. NW.)	+24.1	+2.7	Southern Pacific	−21.6	−2.4
Upper Mississippi	+24.7	+2.7			
Missouri Valley	+20.2	+2.2			
Northern slope	+4.1	+0.5			
Middle slope	+4.7	+0.5			
Southern slope (Abilene)	+1.3	+0.1			

DIURNAL PERIODICITY.

The regular diurnal period in temperature is shown by the hourly means given in Table V for all stations having self-registers.

LIMITS OF FREEZING TEMPERATURE.

The region within which the air has had a freezing temperature at some time during the month is bounded by the minimum isotherm of 32°. During September minima of 32°, or less, were reported over the region north of a line passing from central Minnesota to western Kansas, thence northward to eastern Montana, thence southwest to eastern California, and northward to Alberta.

PERIODS OF HIGH TEMPERATURE.

The map of maximum temperatures during September shows that the principal periods were as follows:

(A) On the 1st the maximum temperatures of the month occurred in Louisiana, Tennessee, Wyoming, Minnesota, Wisconsin, Iowa, and northern Illinois, and on the 2d they occurred in Michigan, Indiana, and central Kentucky. By the 3d this region of high temperature had moved eastward over Ohio and Lake Erie into Pennsylvania. It disappeared on the 4th and 5th in northern New England.

(B) On the 6th and 7th the maximum temperatures of the month occurred in portions of Kansas and southward throughout central and eastern Texas. This area moved eastward and prevailed over Arkansas and Missouri on the 8th, southern Illinois on the 9th, and the entire Atlantic coast, from Florida to Connecticut, on the 10th. The maximum temperatures on this latter date were from 94 to 96 throughout this region and occurred during the prevalence of a region of southwest winds and clear sky blowing toward the low pressure that was then central in New Brunswick, while an area of high pressure, with colder northwest winds and light rain, was advancing eastward over the Appalachians.

(C) On the 10th the highest temperatures of the month occurred in Washington and Oregon; this area moved eastward over Montana on the 11th and Dakota on the 12th.

(D) On the 21st, 22d, and 23d the maximum temperatures of the month generally occurred in Arizona and California, and this period of high temperature extended eastward, passing over Colorado and South Dakota on the 25th, 26th, and 27th.

PERIODS OF LOW TEMPERATURE.

The minimum temperatures occurred principally in the following groups:

(A) On the 8th in central Iowa, on the 11th in central Missouri, and on the 11th and 12th in New Mexico and western Texas.

(B) On the 24th and 25th over the Lake region, Wisconsin, Illinois, Indiana, and Ohio. On the 26th this region had extended southward into eastern Texas, Louisiana, and throughout the entire series of States from the eastern Gulf to New England. This was in connection with the northeast winds that prevailed throughout this entire region and were flowing from the high pressures over the St. Lawrence Valley southward into the low pressure attending the hurricane that was then central in Florida.

AREAS OF 20° RISE IN TWENTY-FOUR HOURS.

The daily weather charts show by heavy dotted lines the regions over which the temperature has risen 20° in the preceding twenty-four hours. The following list enumerates all of these areas and gives the dimensions of the principal axes in miles.

Such rapid rises occur less frequently in summer than in winter; they are largely due to the rapid descent and rapid warming by compression of layers of air that are, by reason of their dryness, rather denser than the surrounding air; they are also frequently due to the rapid descent of air flowing toward the regions of low pressure near the center of a cyclone.

(A) On the 18th, at 8 a. m., a ridge 100 by 400 extending from the eastern border of North Dakota northward into Manitoba. This was a region of warm southerly winds blowing toward low No. X, which was at that time central in northern Alberta.

(B) On the 25th, at 8 p. m., 400 by 200 covering South Dakota and the eastern portion of North Dakota. This was a region of warm southerly winds south and east of and close to the center of low pressure No. XIV, which was then in North Dakota. These warm winds were an outflow from the same area of high pressure that was at that time bringing the coldest temperatures of the month to the Atlantic and Gulf States.

AREAS OF 20° FALL IN TWENTY-FOUR HOURS.

A fall of temperature of 20°, or more, in twenty-four hours is not called a cold wave by the Weather Bureau unless the temperature falls below 40°, and is, therefore, likely to cause a frost injurious to vegetation, but all falls of 20° are indicated on the Daily Weather Map by inclosing the areas within which they occur by heavy dotted lines, and the following list enumerates those regions for the month of September (the dimensions of the principal axes of the areas are stated in miles):

(A) On the 4th, a. m., in North Dakota, 200 by 100. This fall of temperature occurred in an area of light westerly winds, with clear sky, immediately following the low pressure of the preceding day.

(B) On the 10th, p. m., two small areas, about 100 by 200,

in central Texas and in Missouri and Illinois. Both of these were at this time in the rear of an area of cloud and rain that had just moved southeastward in the presence of an advancing area of high pressure. 11th, a. m., a similar small area, 150 by 100, and similarly located, occurred in Ohio.

(C) 11th, p. m., 300 to 200 on the coasts of Oregon and Washington. This fall of temperature was largely due to a return to normal conditions after the period of unusually high temperature experienced on the 10th, and which latter was caused by the flow of warm southwest winds over Oregon and Washington toward the low pressure in British Columbia. On the 12th, at 8 p. m., a large area, 1,000 by 300, extended from Alberta to Nevada in the rear of low No. IX, which was then central in Montana. This extensive increase in size, during twenty-four hours, shows what a large mass of air was at that time flowing in the upper regions from the high pressure over the Pacific toward the low pressure that had just crossed the Rocky Mountains. 13th, a. m.. 500 by 300, in Idaho, Nevada, and Utah; 13th, p. m., 600 by 200, in eastern Wyoming, Montana, and Manitoba; the magnitude of this cold area is remarkable for this season of the year, and its eastward advance apparently caused the trough of low pressure that prevailed on the 13th to divide into two distinct areas of low pressure, of which the southern one soon filled up. 14th, a. m., 200 by 100, in eastern Wyoming; 14th, p. m., 100 by 100, Manitoba. 15th, a. m., 100 by 100, in eastern Texas and Nebraska. These last three small areas represented the breaking up of the original large region of low temperature.

(D) 16th, a. m., 200 by 200, Lake Huron.

(E) 22d, p. m., 300 by 100, eastern Wyoming and northern Colorado. This area represented the front of the advancing high pressure then central in British Columbia. 23d, a. m., 100 by 200, Colorado, Wyoming, and South Dakota; the area of 20° fall had moved a little southeastward while the ridge of high pressure had extended from British Columbia southeast to Missouri. 23d, p. m., 600 by 200, Colorado, Kansas, Missouri, and Indian Territory.

(F) 27th, p. m., 600 by 200, North Dakota, South Dakota, Wyoming, Colorado, and Nebraska. This area was immediately north of the low pressure which was then central in northern Kansas. 29th, p. m., 600 by 300, Minnesota, Iowa, and Kansas; in some portions of this region the temperature fell about 40° in twenty-four hours; the colder area of the day before had moved 500 miles southeastward into a region where warm southerly winds had been prevailing. 30th, a. m., 900 by 200, from Wisconsin to Indian Territory. 30th, p. m., 300 by 200, Lake Superior.

FROSTS.

The principal frosts that have occurred during the month were as follows: 3d, Eastport, Me.; 4th, Cross, S. Dak.; 8th, Bowdle, S. Dak.; 11th, Northville, S. Dak., and Crandon, Wis.; 13th, Edmanton, Cal., Reno, and Lewers Ranch, Nev.; 14th, Single Tree, Utah; 16th, East Tawas, Mich.; 17th, numerous places in South Dakota and Wyoming; 18th, Iowa and Wisconsin; 23d, Pullman, Wash., and several stations in South Dakota and Nebraska; 24th, Illinois and Nebraska; 25th, Michigan and Ohio; 26th, New York, Pennsylvania, and New Hampshire. All the frosts just enumerated were sufficient to kill tender vegetation.

Tables showing the average date of last killing frosts will be found in the MONTHLY WEATHER REVIEW for February, 1888, and tables of the first killing frost in the REVIEW for July, 1888. From these it appears that the frosts of the current month occurred at about the usual date in Dakota, Iowa, Wisconsin, New York, Pennsylvania, and New Hampshire, but rather early in Michigan, Nebraska, Illinois, and Maine.

The following table shows the dates of the occurrence of the first light and heavy frosts and the first snow of the season at the respective stations:

Dates of first light and heavy frosts and snow, September, 1894.

State and station.	First frost.		Snow.
	Light.	Heavy.	
Alabama.			
Newburg	26		
Arizona.			
Calabasas	28		
Eagle Pass	29		
Keams Canyon	9	28	
Lochiel	29		
Show Low		9	
Arkansas.			
Clarksville	25		
Corning	26		
Keesees Ferry	26		
California.			
Adin		28	
Edmanton		13	
Greenville		13	
Independence	13		
La Porte	1	13	29
Lick Observatory	30		
Nevada City		12	
Oleta	13		
Placerville	10		
Pleasanton	12		
San Jose	13		
Summerdale			30
Susanville		12	
Yreka	14	28	
Colorado.			
Akron	20	30	
Alma			7
Box Elder	9	15	
Canyon	24		
Collbran		27	
Delta		11	
Divide Exper'l Station		14	
Downing		11	
Dumont	9		
Fort Collins		14	
Garnett		14	
Glen Eyrie		24	
Gold Hill			28
Hugo (near)	14		
Husted	11	15	
Julesburg	15		
La Jara	8	15	
Lavender		8	
Le Roy		24	
Leslie		23	
Loveland	9		
Moraine			28
Pagoda (near)	12	14	
Parachute		15	
Pueblo	15		
Rangely		13	
Red Cliff			28
Rocky Ford	24		
Ruby			7
Saguache	5	10	
San Juan	1	6	8
San Luis	11	15	
Seibert	11		
Spring Gulch			28
Stamford		11	
Steamboat Springs			13
Sunnyside			8
Surface Creek		11	
Thon	14	29	
T. S. Ranch	14	15	
Twin Lakes			7
Connecticut.			
Canton	13		
Greenfield Hill	25		
Hartford	26		
Middletown	26		
New Hartford	26		
Southington	26		
South Manchester	26		
Storrs	12	26	
Thompson	26		
West Simsbury	12	26	
Georgia.			
Adairsville	21		
Idaho.			
Atlanta			12
Fort Sherman		22	
Grangeville		29	12
Idaho Falls		16	
Lake			13
Murray		27	
Paris			13
Salubria			11
Illinois.			
Albion	25		
Aurora	25		
Bloomington	23		
Bushnell	24		
Carlinville	26		
Chemung	24	25	
Chicago	24		

State and station.	First frost.		Snow.
	Light.	Heavy.	
Illinois—Cont'd.			
Decatur	25		
Golconda	26		
Herrins Prairie	25		
Louisville	25		
Martinsville	25		
Mattoon	24		
Monmouth	11		
Mount Pulaski	25		
Olney a.	25		
Oswego	24	25	
Palestine	25		
Paris	25	30	
Peoria	25		
Philo	24	25	
Riley	25		
Rushville	11		
Springfield (near)	25		
Sycamore	24		
Tuscola	25		
Warsaw	11		
Winnebago	24	25	
Zion	10		
Indiana.			
Ashboro	25		
Bedford	25		
Butlerville		25	
Columbus	25		
Connorsville	25		
Crawfordsville		24	
Degonia Springs	26		
Franklin		25	
Huntingburg	26		
Indianapolis	25		
Jasper		24	
Lafayette	25		
Madison	25		
Marengo	25		
Marion	11	25	
Markle	24	25	
Mauzy	11		
New Albany	25		
Plymouth	24		
Princeton	25		
Rockville	11		
Scottsburg	25		
Terre Haute	26		
Vevay	25		
Worthington	25		
Iowa.			
Afton	18		
Albia	11		
Algona		11	
Alta	11	24	
Amana	11		
Ames b.		18	
Ames c.	11	17	
Atlantic		11	
Audubon		18	
Belle Plaine	11		
Cedar Rapids	11		
Charles City	11		
Clarinda	11		
Clinton	24		
College Springs	30		
Corning	11		
Cresco		18	
Davenport	24		
Decorah	10	18	
Delaware	11	24	
Des Moines	18		
Elkader	11	18	
Emmetsburg	11		
Fort Madison	24		
Galva		17	
Glenwood	11		
Grand Meadow	18		
Grundy Center	11	18	
Hampton	11	24	
Hopkinton	11		
Humboldt	11		
Independence	11		
Indianola	23		
Iowa City	11	24	
Iowa Falls	11	18	
Jefferson	11	24	
Keokuk	24		
Larrabee		11	
Maxon	17		
Mechaniesville	11		
Monticello	11	18	
Newton	18		
Ogden	11		
Osage	11	18	
Osceola	11		
Oskaloosa	11		
Ottumwa	11		
Ovid	11	18	
Panama	11	18	

Dates of first light and heavy frosts and snow—Continued.

State and station.	First frost. Light.	First frost. Heavy.	Snow.
Iowa—Cont'd.			
Richland	11		
Rockwell City		11	
Rock Rapids		10	
Sac City	11		
Seymour	18		
Sibley		11	
Sioux City	11	30	
Spirit Lake	11		
Sutherland	10		
Toledo	18		
Villisca	11		
Vinton	11	18	
Washington	11		
Webster City	11	18	
Williams	11	18	
Winterset	11		
Wilton	24		
Kansas.			
Abilene	30		
Achilles		14	
Allison	11		
Atchison	24		
Blaine	10	29	
Burlington	11		
Coffeyville	11		
Concordia	11		
Cunningham	30		
Dodge City	30		
Downs	11	30	
Elk City	30		
Emporia	30		
Englewood	20		
Eureka Ranch	15	30	
Fort Riley		30	
Garden City	11		
Gibson	30		
Grenola	30		
Halstead		30	
Hays City		11	
Hutchinson	11		
Ionia	11	30	
Jaqua	23		
Johnson	30		
Kiowa	30		
Lakin		30	
Lebo	30		
Leoti	10		
Macksville	30		
Manhattan	11	30	
Medicine Lodge	30		
Minneapolis	11	30	
Morland		11	
Mount Hope	15		
Ness City	11		
New England Ranch	14		
Olathe	17		
Pleasant Dale	15	30	
Quinter	29		
Rome	30		
Ulysses	11		
Wakefield	15		
Wamego	11		
Washington	30		
Westmoreland	3	10	
Wichita	30		
Winfield	30		
Kentucky.			
Bowling Green	26		
Caddo	11		
Canton	26		
Carrollton	25		
Eddyville	25		
Greendale	20		
Greensburg	26		
Harrodsburg	25		
Henderson	25		
Louisville (near)	25		
Marrowbone	26		
Pellville	26		
Sandy Hook	25		
Shelbyville	25		
Maine.			
Belfast		26	
Cornish		26	
Easton	3	8	
Eastport	27		
Farmington		12	
Gardiner	27		
Houlton		3	
Lewiston	12	26	
Mayfield	12		
North Bridgton	26	27	
Orono	3	26	
Maryland.			
Bachmans Valley	25		
Boettcherville	26		
Cumberland	26		
Oakland	24	26	
Princess Anne	8	19	
Sunnyside	25		
Taneytown	25		
Massachusetts.			
Adams		26	
Amherst Exp. Station		26	
Andover	26		
Bedford	13	26	
Blue Hill (summit)	26		
East Templeton		26	
Groton		26	
Leeds		26	
Leominster	26		
Mansfield	26		
Monson		26	
Pittsfield		26	
Randolph		11	
Salisbury	27		
South Dennis	14		
Westboro	13		
Winchendon		29	
Winthrop		26	
Worcester	26		
Michigan.			
Adrian		25	
Allegan	25		
Alma		25	
Alpena		12	
Ann Arbor		25	
Arbela		18	
Ball Mountain	25		
Berlin	25		
Boon	12	19	
Bronson		25	
Detroit	12	25	
Grand Haven	25		
Grape	25		
Hanover	24	26	
Harbor Springs		18	
Hart	19		
Howell		25	
Jeddo	25		
Kalamazoo	20		
Lansing		25	
Lathrop		12	
Lewiston		24	
Madison	25	26	
Marquette		18	
Mayville	25		
Mottville	25		
Ovid	25		
Parkville	25		
Port Huron	25		
Rawsonville		25	
Rockland	10		
St. Ignace	18	25	
Sand Beach	24		
Sault Ste. Marie	12	25	
Thornville		25	
Ypsilanti		25	
Minnesota.			
Airlie	10	11	
Alexandria		17	30
Beardsley	4	11	
Bird Island	10	16	
Blooming Prairie	10	24	
Caledonia	24		
Camden	11	24	
Campbell		11	
Carver	10	18	
Clear Lake	11	17	
Clearwater		17	
Dawson		11	
Duluth	18		
Farmington	4	11	
Fergus Falls		11	
Grand Meadow		17	
Hutchinson	11		
Jadis		11	
Leech Lake		17	
Long Prairie	15	25	29
Luverne		11	
Maple Plain		11	
Marfield		11	29
Mazeppa		18	
Milan	11	17	29
Minneapolis	11		
Minnesota City	11	18	
Montevideo	11	23	
Moorhead		11	
Morris	10	17	
New Ulm	10	29	
Park Rapids	10	11	
Pine River	10	18	
Red Lake	11	17	
Rolling Green		24	
Rush City		11	
St. Charles		18	
St. Cloud	10	24	
St. Olaf	10		
St. Paul	11		
St. Peter		11	
St. Vincent		11	
Sandy Lake Dam	11	17	
Sauk Center	15	17	
Sunrise City		11	
Minnesota—Cont'd.			
Two Harbors		24	
Wabasha	11	18	
Willmar		10	
Winona	11		
Worthington	9	24	
Missouri.			
Bethany	18		
Carrollton	11		
Downing	11		
Eight Mile		30	
Elmira	18		
Fairport	18		
Gallatin	11		
Gayoso	26		
Grove Dale	25		
Harrisonville	18		
Kansas City	18		
Kidder	18		
Liberty	30		
Maryville	11		
Mexico	16		
Miami	30		
Nevada	30		
New Hartford	23		
Oak Ridge	20		
Oregon	18		
Phillipsburg	11		
Pickering	11	18	
Platte River	11		
Potosi	25		
Princeton	11		
Sarcoxie	18		
Springfield	30		
Stellada	11		
Sublett	11		
Tindall	16		
Warrensburg	11		
Montana.			
Anaconda			27
Billings	2	28	
Boulder			13
Bozeman	4		
Butte	13	29	12
Columbia Falls	6	16	
Fort Logan			13
Glendive	17	23	
Great Falls	14	15	23
Havre	10	14	13
Helena		24	22
Hogan			22
Kipp	3	7	12
Marysville	3	13	3
Miles City	29		13
Mingusville	9	16	
Pony			13
Red Lodge			22
Virginia City			12
White Sulphur Springs		23	13
Nebraska.			
Agee	10	29	
Ansley	11		
Ashland	11		
Bassett	9	14	
Beatrice		29	
Beaver City	30		
Bratton	30		
Chadron		10	
Columbus	11	30	
Chester	11	30	
Cornlea		10	
Cortland	30		
Creighton	11		
Culbertson		29	
David City	23	30	
Ericson		11	
Ewing	11	30	
Fontanelle	11	30	
Franklin	30		
Geneva	10	30	
Genoa	11	30	
Gering	16	23	
Glenwood	10		
Gothenburg	11	30	
Hartington	11		
Harvard	30		
Hay Springs	10	24	28
Hebron	11	30	
Imperial	12		
Indianola	29		
Kennedy	10	30	
Lexington		14	
Lodge Pole	15	24	
Lynch	11	30	
Madrid		15	
Marquette	30		
Minden	30		
Mullen	29		
Norfolk	11		
North Loup	10		
North Platte	10	24	
Oakdale	11		
O'Neill	11	30	
Nebraska—Cont'd.			
Palmer	30		
Ravenna		11	
Santee Agency	9	10	
Seward		30	
Springview	10	29	
Stanton	11	30	
Sutton	15	30	
Table Rock	30		
Tecumseh	11		
Tekamah	11	30	
Turlington	11		
Valentine	15	23	
Weeping Water	11		
Wilcox	11	30	
York		29	
Nevada.			
Austin			30
Belleville			27
Belmont			27
Carson City	8	13	30
Cortez			30
Ely			27
Empire Ranch			27
Gold Hill			29
Lewers Ranch		13	30
Marlette Lake			27
Osceola			30
Palmetto			15
Ruby Valley			27
Stoffel			30
Tybo			30
Virginia City			20
Winnemucca	7	13	
New Hampshire.			
Alstead		26	
Antrim		25	
Berlin Mills		26	
Bethlehem		26	
Brookline		26	
Concord		26	
East Canterbury		26	
Grafton		12	
Hanover		26	
Lancaster		26	
Littleton		26	
Plymouth		26	
Sanbornton		26	
Stratford		26	
New Jersey.			
Belvidere	26		
Charlotteburg	25	26	
Dover		26	
Franklin Furnace	26		
Junction	26		
Lambertville	25		
Millville	26		
New Brunswick	26		
Newton		26	
Somerville	12		
Toms River	25		
West Summit	26		
New Mexico.			
Albuquerque	15		
Bloomfield	14	15	
Ciruella		10	
East Las Vegas		11	
Halls Peak	8	11	
Monero	8	11	
Olio		29	
San Marcial	15		
Santa Fe	11		
Socorro	14		
Springer	11	12	
Sulphur Hot Springs		11	
Taos		14	
New York.			
Addison		26	
Albany	26		
Alfred Center		26	
Angelica		26	
Arcade		26	
Baldwinsville	25		
Bedford	26		
Binghamton		26	
Brookfield	12		
Buffalo		26	
Cooperstown	26		
Factoryville	25	26	
Fleming	26		
Friendship		26	
Glens Falls		26	
Gloversville	13	26	
Hamilton		25	
Hess Road Station		26	
Humphrey	12	26	
Hyndsville		26	
Ithaca		26	
Lebanon Springs	12	26	
Le Roy		26	
Lockport	26		
Lowville		26	
Malone		26	

Dates of first light and heavy frosts and snow—Continued.

State and station.	First frost.		Snow.
	Light.	Heavy.	
New York—Cont'd.			
Mount Morris	.....	26	.....
New Lisbon	12	26	.....
North Hammond	26	.....	.....
Number Four	12	26	26
Ogdensburg	.....	26	.....
Oswego	26	.....	.....
Perry City	.....	26	.....
Rochester	.....	26	.....
Saranac Lake	.....	25	.....
South Canisteo	.....	26	.....
South Kortright	12	26	.....
Stillwater	26	.....	.....
Turin	.....	26	.....
Varysburg	.....	26	.....
Wappingers Falls	26	.....	.....
Watertown	26	.....	.....
Wedgwood	.....	26	.....
North Carolina.			
Bailey	21	.....	.....
Blowing Rock	21	.....	.....
North Dakota.			
Berlin	11	.....	.....
Bismarck	10	17	.....
Bottineau	4	.....	.....
Churchs Ferry	.....	.....	29
Ellendale	.....	11	.....
Forman	.....	10	28
Fort Berthold	.....	16	.....
Fort Yates	.....	16	.....
Gallatin	.....	10	.....
Jamestown	10	17	.....
Kelso	4	.....	.....
Lakota	.....	15	29
Larimore	17	24	.....
McKinney	.....	17	.....
Napoleon	.....	17	.....
New Salem	.....	16	.....
Portal	.....	10	.....
Power	11	16	.....
Steele	.....	9	29
University	11	17	.....
Wahpeton	.....	7	.....
White Earth	10	30	23
Wild Rice	.....	11	.....
Williston	.....	10	.....
Woodbridge	.....	.....	29
Ohio.			
Akron	26	.....	.....
Ashland	25	26	.....
Atwater	28	.....	.....
Auburn	26	.....	.....
Bangorville	24	.....	.....
Batavia	24	.....	.....
Bellefontaine	20	.....	.....
Bement	.....	26	.....
Benton Ridge	.....	25	.....
Bethany	25	.....	.....
Binola	26	.....	.....
Bissels	26	.....	.....
Bladensburg	25	.....	.....
Bloomingburg	25	.....	.....
Bowling Green	25	.....	.....
Bucyrus	24	.....	.....
Caledonia	25	.....	.....
Cambridge	25	.....	.....
Canton	26	.....	.....
Cardington	12	24	.....
Cedarville	26	.....	.....
Cherry Fork	25	.....	.....
Cincinnati	25	.....	.....
Clarksville	25	.....	.....
Coalton	25	.....	.....
Columbus	23	.....	.....
Cynthiana	25	.....	.....
Dayton *b*	25	.....	.....
Defiance	.....	25	.....
Dupont	.....	24	.....
Ellsworth	26	.....	.....
Elyria	.....	26	.....
Findlay	25	.....	.....
Fostoria	25	.....	.....
Frankfort	25	.....	.....
Garrettsville	.....	26	.....
Gratiot	25	.....	.....
Greenfield	23	.....	.....
Green Hill	25	.....	.....
Greenville	25	.....	.....
Guysville	25	.....	.....
Ohio—Cont'd.			
Hackney	26	.....	.....
Hedges	.....	25	.....
Hillhouse	26	.....	.....
Hillsboro	25	.....	.....
Hiram	26	.....	.....
Jacksonboro	24	.....	.....
Kenton	.....	22	.....
Kilbourne	.....	25	.....
Killbuck	25	.....	.....
Levering	.....	26	.....
Logan	25	.....	.....
Lordstown	.....	26	.....
Lowell	25	.....	.....
McArthur	25	26	.....
Milligan	.....	25	.....
Napoleon	25	.....	.....
Nelsonville	24	.....	.....
New Bremen	.....	25	.....
New Comerstown	25	.....	.....
New Holland	11	25	.....
New Paris	.....	25	.....
North Fairfield	.....	25	.....
North Lewisburg	25	.....	.....
Norwalk	26	.....	.....
Ohio State University	25	.....	.....
Pataskala	25	.....	.....
Plattsburg	.....	25	.....
Pomeroy	25	.....	.....
Portsmouth	25	.....	.....
Ridgeville Corners	25	26	.....
Ripley	25	.....	.....
Rittman	25	.....	.....
Rocky Ridge	25	26	.....
Rosewood	25	.....	.....
Sandusky	26	.....	.....
Sharon Center	25	.....	.....
Sidney	24	25	.....
Swanton	.....	25	.....
Sylvania	.....	25	.....
Tiffin	25	.....	.....
Toledo	25	.....	.....
Upper Sandusky	24	.....	.....
Vanceburg	25	.....	.....
Van Wert	25	.....	.....
Vermillion	26	.....	.....
Vickery	25	.....	.....
Walnut	25	.....	.....
Warren	.....	26	.....
Warsaw	25	.....	.....
Wauseon	.....	25	.....
Waverly	25	.....	.....
Waynesville	25	.....	.....
Wellington	.....	26	.....
Westerville	25	.....	.....
Wheeler	26	.....	.....
Wooster	26	.....	.....
Oklahoma.			
Pond Creek	30	.....	.....
Oregon.			
Baker City	14	.....	.....
Crook	.....	13	.....
Heppner	4	.....	.....
Hubbard	13	.....	.....
Joseph	.....	3	12
Mount Hood	.....	3	2
Pendleton	23	.....	.....
The Dalles	23	.....	.....
Vale	4	28	.....
Williams	5	27	.....
Pennsylvania.			
Aqueduct	26	.....	.....
Blooming Grove	25	26	.....
Carlisle	26	.....	.....
Cassandra	.....	25	.....
Coatesville	25	.....	.....
Coopersburg	12	.....	.....
Drifton	.....	26	.....
Dyberry	.....	26	.....
East Mauch Chunk	26	.....	.....
Edinboro	26	.....	.....
Emporium	.....	26	.....
Grampian	12	.....	.....
Greensboro	25	.....	.....
Greenville	26	.....	.....
Harrisburg	26	.....	.....
Hollidaysburg	26	.....	.....
Honesdale	.....	26	.....
Huntingdon	25	.....	.....
Pennsylvania—Cont'd.			
Kane	26	.....	.....
Lebanon	12	.....	.....
Le Roy	.....	26	.....
Lewisburg	26	.....	.....
Lock Haven	.....	26	.....
Phœnixville	26	.....	.....
Pittsburg	25	.....	.....
Quakertown	26	.....	.....
Saegerstown	.....	26	.....
Salem Corners	.....	26	.....
Selins Grove	.....	26	.....
Shinglehouse	.....	26	.....
Smethport	25	.....	.....
South Eaton	26	.....	.....
State College	26	.....	.....
Uniontown	25	.....	.....
Wellsboro	.....	26	.....
Wilkesbarre	.....	27	.....
York	26	.....	.....
Rhode Island.			
Narragansett Pier	22	.....	.....
South Dakota.			
Alexandria	.....	17	.....
Armour	18	30	.....
Bowdle	10	.....	.....
Brookings	10	11	29
Castlewood	13	17	29
Clark	10	30	.....
Cross	.....	4	28
Faulkton	10	17	.....
Flandreau	10	11	.....
Forestburg	11	17	.....
Fort Meade	.....	24	.....
Fort Sully	.....	30	.....
Frankfort	10	17	.....
Gary	23	.....	29
Greenwood	.....	30	.....
Highmore	9	29	.....
Hotch City	.....	19	.....
Howard	.....	17	.....
Huron	11	17	.....
Kimball	10	28	.....
Northville	.....	11	.....
Oelrichs	9	.....	.....
Parker	10	24	.....
Parkston	14	30	.....
Piedmont	9	10	.....
Pierre	15	30	.....
Plankinton	11	23	.....
Rapid City	.....	30	.....
Rosebud	10	.....	.....
Sioux Falls	.....	11	.....
Webster	.....	11	29
Wessington Springs	.....	30	.....
Tennessee.			
Nunnelly	.....	.....	.....
Texas.			
Hartley	.....	26	.....
Utah.			
Cisco	.....	28	.....
Coalville	.....	.....	13
Grouse Creek	.....	12	13
Heber	.....	14	.....
Lake Station	.....	11	.....
Levan	13	14	.....
Loa	.....	7	.....
Losee	.....	13	.....
Manti	23	.....	.....
Moab	14	15	.....
Mount Pleasant	.....	13	.....
Ogden	.....	.....	13
Parowan	13	14	.....
Salt Lake City	.....	29	.....
Scofield	.....	.....	1
Singletree	.....	14	7
Snowville	.....	13	.....
Thistle	27	30	.....
Vermont.			
Burlington	.....	26	.....
Cornwall	.....	26	.....
Hartland	.....	26	.....
Jacksonville	25	26	.....
Norwich	.....	26	.....
St. Johnsbury	.....	26	.....
Simonsville	12	26	.....
Strafford	.....	26	.....
Wells	.....	26	.....
Woodstock	12	26	.....
Virginia.			
Hot Springs	25	.....	.....
Stephens City	26	.....	.....
Washington.			
Blaine	13	.....	.....
Bridgeport	24	.....	.....
Davenport	27	.....	.....
Dayton	.....	23	.....
Ellensburg	11	22	.....
Everett	19	.....	.....
Hunters	.....	3	12
Moxee Valley	16	27	.....
Pomeroy	23	.....	.....
Port Angeles	13	.....	.....
Port Crescent	21	.....	.....
Pullman	.....	23	.....
Pysht	12	.....	.....
Rosalia	3	22	.....
Silver Creek	23	.....	.....
Snohomish	24	.....	.....
Spokane	23	.....	.....
Union City	23	.....	.....
Waterville	.....	17	.....
Wenatchee Lake	14	23	.....
West Virginia.			
Beverly	25	.....	.....
Bloomery	26	.....	.....
Buckhannon	.....	25	.....
Burlington	26	.....	.....
Central Station	.....	25	.....
Creston	26	.....	.....
Davis	.....	25	.....
Ella	25	.....	.....
Glenville	26	.....	.....
Grafton	25	.....	.....
Leachtown	25	.....	.....
Morgantown	25	.....	.....
New Martinsville	25	.....	.....
Parkersburg	25	.....	.....
Point Pleasant	25	.....	.....
Raleigh	25	.....	.....
Sandyville	25	.....	.....
Spencer	25	.....	.....
Tannery	25	.....	.....
Weston	25	26	.....
Wheeling	25	.....	.....
Wisconsin.			
Amherst	12	25	.....
Antigo	.....	24	.....
Baraboo	.....	25	.....
Barron	.....	11	.....
Belleville	17	25	.....
Beloit	25	.....	.....
Crandon	.....	11	.....
Delevan	24	.....	.....
Depere	18	.....	.....
Fond du Lac	11	25	.....
Green Bay	18	25	.....
Hartford	11	24	.....
Harvey	24	25	.....
Hayward	.....	11	.....
Hillsboro	.....	12	.....
Janesville	23	24	.....
La Crosse	24	.....	.....
Lancaster	24	.....	.....
Manitowoc	25	.....	.....
Menomonie	11	18	.....
Milwaukee	.....	25	.....
New Holstein	25	.....	.....
Oconomowoc	.....	25	.....
Osceola	.....	17	.....
Pepin	10	.....	.....
Reedsburg	.....	25	.....
Royalton	11	25	.....
Sharon	.....	24	.....
Shawano	12	25	.....
Viroqua	.....	24	.....
Waukesha	24	.....	.....
Westfield	12	18	.....
Weston	.....	18	.....
Wh[illegible]hall	.....	24	.....
Wyoming.			
Big Horn Ranch	.....	4	.....
Cheyenne	10	17	.....
Fort Yellowstone	.....	.....	12
La Barge	.....	.....	12
Lander	.....	4	.....
Laramie	.....	14	.....
Lusk	.....	17	.....
Sheridan	.....	14	.....